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On Whooping Cough: Its Great Fatality, and the  
Necessity for Isolation and Rest in its Treat-  
ment.

BY

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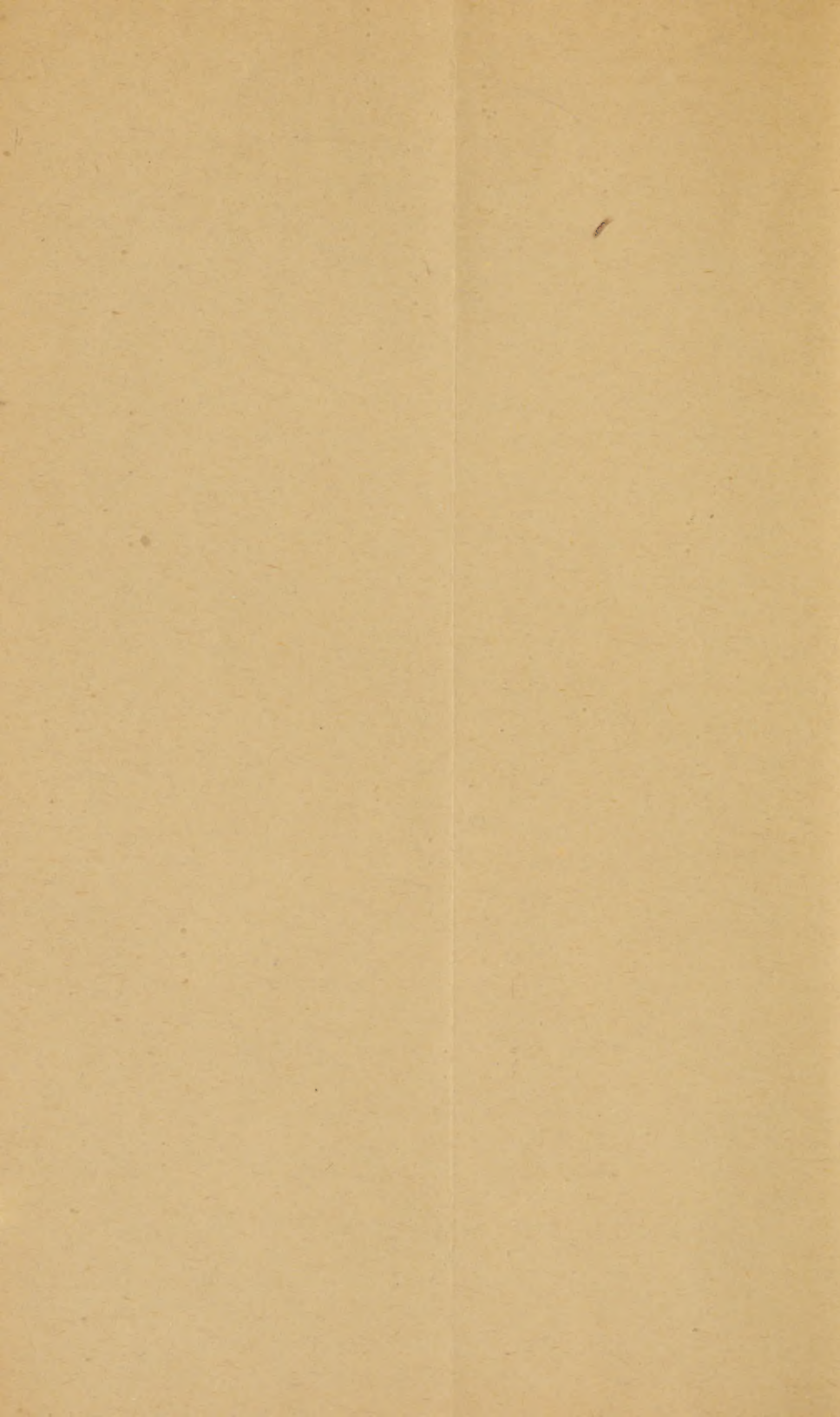
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# ON WHOOPING COUGH: ITS GREAT FATALITY, AND THE NECESSITY FOR ISOLATION AND REST IN ITS TREATMENT.\*

BY WILLIAM W. JOHNSTON, M.D.,

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The reasons for the selection of whooping cough as the subject of the monthly essay will be more apparent, I trust, at the end than they may seem to you at the beginning of this paper.

It is strange in the general revival of the study of the infectious contagious diseases that pertussis should have come in for such a small share of attention and that so little change should have taken place in plans in treatment which have been the same for an indefinite period. It is true that we do not bleed and give nauseating emetics, as in the days of Cullen, but has the discovery of the infectious nature of the disease led to the employment of the modern methods of prevention which we use with other diseases of the same class?

Moreover whooping cough above all other diseases is a people's disease; its diagnosis, management and treatment are largely in the hands of the laity. Boards of Health have no control over it; there are no rules regulating its diffusion, and the medical profession have abdicated the field to the *nostrum vender* or to domestic medicine.

Such being the position of the medical profession and the sanitary authorities toward whooping cough, the question arises whether the position is justified by the nature and extent of the disease as it affects communities. Is its mortality so slight that it should not receive the advantages of modern preventative science? I propose to show that not only is this not the case, but that it stands along with scarlet fever and measles as a death producing disease. The strange anomaly is presented of

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## JOHNSTON : *Whooping Cough.*

the utmost expenditure of effort in the case of one contagious disease and the utmost indifference as regards one equally contagious.

What can be more exact than the present management of a case of scarlet fever with all the refinements of isolation, disinfection and excessive attention to details ; on the other hand what can be more full of negligence, more absolutely empty of all precautionary measures than the system with which we deal with whooping cough.

Let us examine into the actual and relative mortality of whooping cough in order to discover the reason, if there is any, for this difference ; let us see if the world has been right in this or if it has paradoxically controlled the spread of the one disease and contributed to the spread of the other.

From 1848 to 1855, 72,000 deaths or one-fortieth of the whole number of deaths were due to whooping cough in England and Wales. In one year in England there were 500,341 deaths ; of these 10,318 were due to whooping cough. In 1876 in England scarlet fever had 11,045 victims, measles 9252, whooping cough 10,201 ; 844 less than scarlet fever and 949 more than measles.

In Basle, according to Hagenbach, the mortality of whooping cough was greater than that from any other disease except typhoid fever and diphtheria.

In Berlin in 1887 there were 257 deaths from scarlet fever, 223 from measles and 535 from whooping cough ; about the same proportion continued during subsequent years.

In 1893 in London there were 2,330 deaths from whooping cough.

In the year ending June 1, 1870, whooping cough had 9,008 victims in this country.

In the United States, according to the Census of 1880, diphtheria leads the list of infectious diseases with 19,854 annual deaths, whooping cough comes next with 10,313, scarlet fever is third with 10,142, while measles has only 5,481 deaths.

The Census of 1890 gives the same place to whooping cough ; measles stands first with a mortality of 9,256,

whooping cough second with 8,432, and scarlet fever last with 5,969 deaths. Diphtheria and croup have a much greater mortality of 41,677. These figures are admitted not to be exact as regards the actual number of deaths, being underestimates, but the relative proportion between the different diseases may be assumed to be correct.

A ten year record in New York City shows 4,094 deaths from whooping cough and 4,062 from typhoid fever.

TABLE I.

Mortality in New York, Brooklyn, Baltimore and Washington, from diphtheria, scarlet fever, measles and whooping cough and the rate of death from each cause to 10,000 inhabitants for year ending May 31, 1890.

FROM THE UNITED STATES CENSUS OF 1890.

Cities of	Diphtheria.	Ratio to 10,000 Pop.	Scarlet Fever.	Ratio to 10,000 Pop.	Mea	Ratio to 10,000 Pop.	Whooping Cough.	Ratio to 10,000 Pop.
New York.	10,134	66.88	4,367	28.82	3822	25.22	2,820	18.80
Brooklyn .....	5,018	62.24	1,840	22.82	767	9.51	1,134	14.07
Baltimore.....	1,188	27.34	296	6.82	733	16.88	501	11.54
Washington.	515	25.49	274	13.50	175	8.62	358	17.72

In Table I. the number of deaths from diphtheria, scarlet fever, measles and whooping cough for the six years ending May 31, 1890 (Census of 1890) is given for the cities of New York, Brooklyn, Baltimore and Washington. It will be seen that diphtheria leads the list in all; of the other three diseases scarlet fever comes first in New York, then measles with 545 fewer deaths than from scarlet fever and last whooping cough with 1,880 deaths one thousand less than measles. In Brooklyn scarlet fever had 1840 deaths, measles 1,075 less, but whooping cough had 367 more than measles and 606 less than scarlet fever.

In comparing the deaths from different causes in the various states, according to the Census of 1890, it is interesting to note that whooping cough claims as many, often more victims than the other more dreaded diseases. In the following list of ten States whooping cough has more

atal cases than scarlet fever and in most of them more than measles.

In Baltimore measles is first with 733 deaths, whooping cough second with 501 or 232 less than measles, scarlet fever is last with 205 less than whooping cough.

In Washington whooping cough leads the list with 358 deaths ; scarlet fever is next with 274, 84 less, and measles has 175, 183 less than whooping cough.

The ratio of deaths from whooping cough to 10,000 inhabitants is 18.10 in New York ; 14.07 in Brooklyn ; 11.54 in Baltimore and 17.72 in Washington.

It will be seen, therefore, that although as compared with scarlet fever and measles the mortality from whooping cough is higher in Washington than in any of the four cities, yet the ratio of deaths from whooping cough to 10,000 population is greater in New York than it is here. Washington, comes next to New York, then Brooklyn and last Baltimore.

TABLE II.

Total mortality in the District of Columbia from scarlet fever, measles, and whooping cough for ten years from 1884 to 1894. Compiled from the report of the Health Officer.

Year.	Scarlet Fever.	Measles.	Whoop. Cough.
1884.	168	179	104
1885.	137	9	70
1886.	48	3	63
1887.	15	14	46
1888.	19	159	17
1889.	31	4	162
1890.	14	10	31
1891.	13	70	38
1892.	26	5	76
1893.	7	10	45
<i>Totals</i>	478	463	652

In Table II. compiled from the records of the Health Officer, the total deaths from scarlet fever, measles and whooping cough in the District in the ten years, 1884 to 1894, are given in parallel columns. The whole number of deaths from whooping cough was 652, from scarlet fever 478 and from measles 462 ; 174 more children died from whooping cough than from scarlet fever, and 189 more than from measles during the ten years. The average annual death rate was 46.3 from measles, 27.8 from scarlet



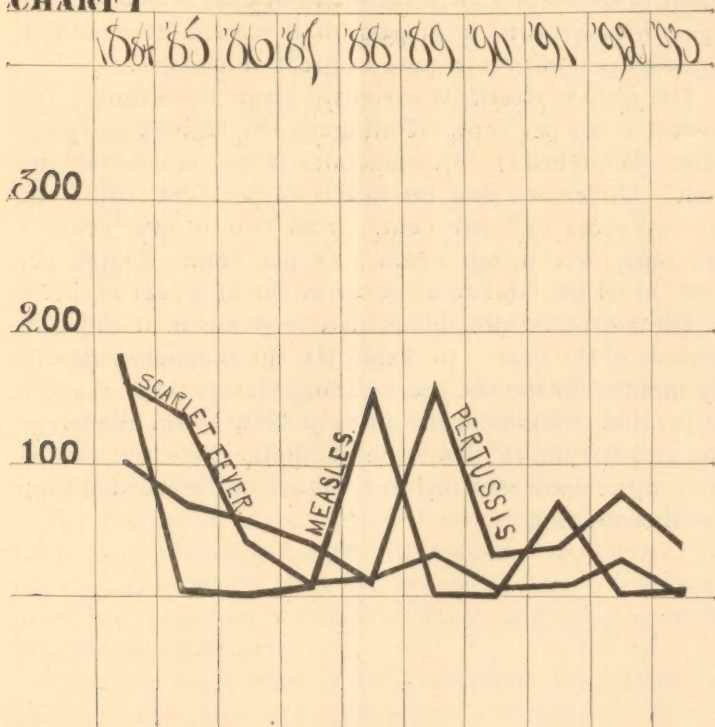
fever and 65.2 from whooping cough. See *Chart I.* for illustration of these differences in the death rate.

Chart I.—Mortality in the District of Columbia from scarlet fever, measles, and whooping cough for ten years ending May 1893.

### MORTALITY IN THE DIST. OF COLUMBIA

FOR THE TEN YEARS ENDING MAY 1893

CHART I



The facts given in these figures are of immense importance. They bring home to us the consciousness that the disease of which we have so little concern, which we do but little to cure and still less to prevent, is annually destroying more lives in our city than scarlet fever of which we have such dread that there is no precaution too precise and no regulation of the Health Office too severe which do not meet with our unqualified approval.

We have not waked up to the knowledge that whooping cough is such a fatal disease as it is here shown to be. We are lulled into security by the statements of the books and by a blind following of the traditional way of looking at the subject without seeing it.

It is true that there are a larger number of cases of whooping cough than of scarlet fever and that the percentage of deaths to the total number of cases is not so great in the former as in the latter disease; but at certain ages the mortality is greater than scarlet fever and in certain epidemics it is quite as great at all ages.

The ratio of deaths is variously given by authors; the lowest is 2.7 per cent. (Kutlinger), the highest is 15 per cent. (Whitehead). In epidemics it has reached 48 per cent. Under one year the rate is 25 per cent.; from one to two years 13.8 per cent.; from two to five years 3 per cent.; five to ten years 1.18 per cent. Thirty per cent. of all the fatal cases occur in the first year of life.

The mortality rate differs also very much at different periods of the year. In Table III. the number of deaths by months for the six years ending May 31, 1890, is given in parallel columns in the cities of New York, Washington and Baltimore. In each of these cities the deaths were more numerous in July, August and September than in other months.



TABLE III.

Mortality from whooping cough by months for six years ending, May 31, 1890. From United States Census of 1890.

Month.		New York.	Washington.	Baltimore.
January	-	227	27	33
February	-	210	17	29
March	-	243	28	41
April	-	230	23	37
May	-	182	17	28
June	-	182	20	39
July	-	313	45	60
August	-	327	55	69
September	-	301	48	45
October	-	213	36	49
November	-	161	19	33
December	-	217	23	38
Totals		2,810	358	501

Chart II. shows the variation of mortality by months in the three cities during six years.

Chart III illustrates the varying mortality by months in 31 large cities of the United States in one year.

Chart IV. shows the different fatalities from whooping cough, measles and scarlet fever in New York City.

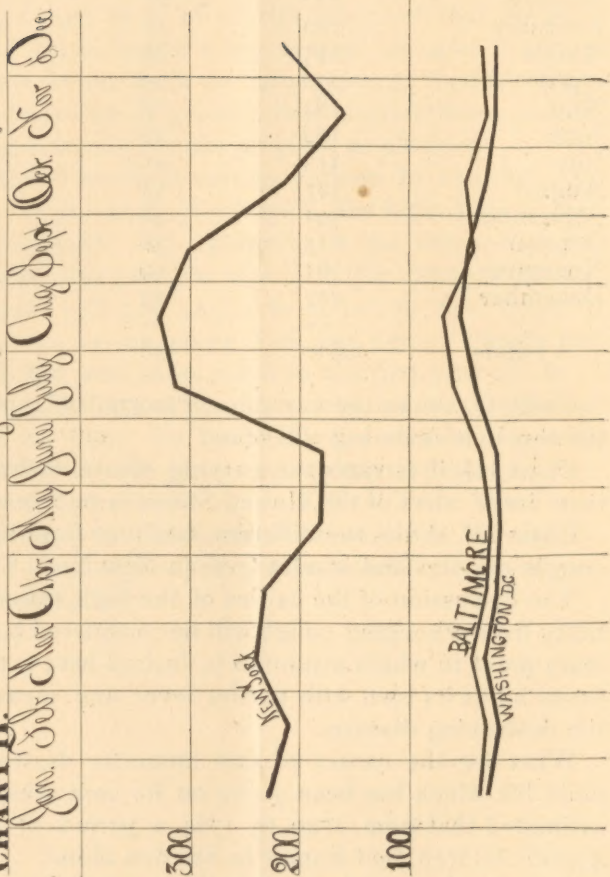
The discussion of the causes of the high summer mortality from whooping cough will be considered later. The main point to which attention is desired here is that pertussis holds its own with scarlet fever and measles as a life destroying disease.

What are the causes of this immense destruction of child life which has been going on for centuries. It was estimated that from 1749 to 1764 a period of 15 years 43,000 children died from it in Sweden alone.

An estimate based on the Census of 1880, adding nothing for the increase of population, would show that in ten years more than one hundred thousand children had died from whooping cough in the United States, which would make a total of over 200,000 in the twenty years ending in 1900.

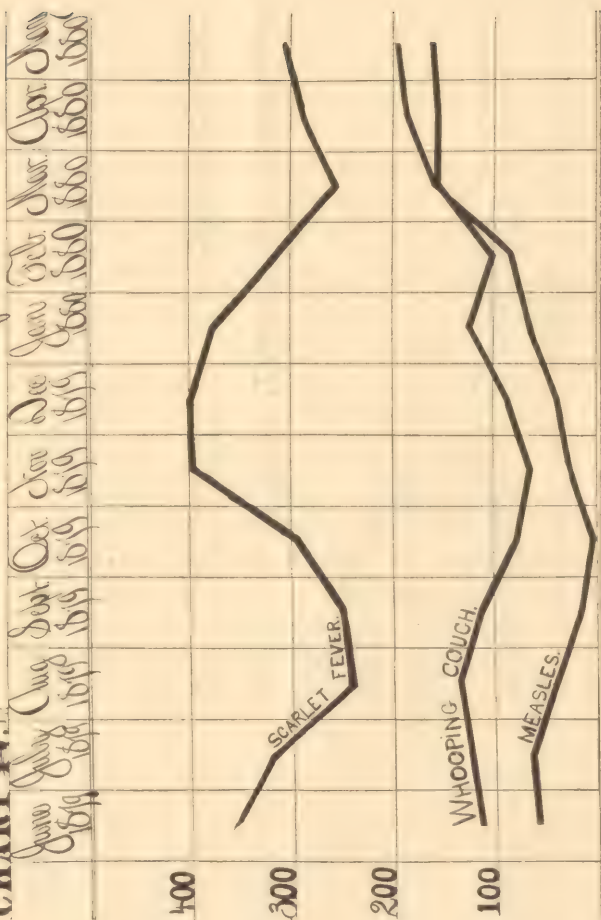
Mortality from Whooping Cough by months for six years ending  
 July 31, 1890 U. S. Census of 1890.

CHART II.

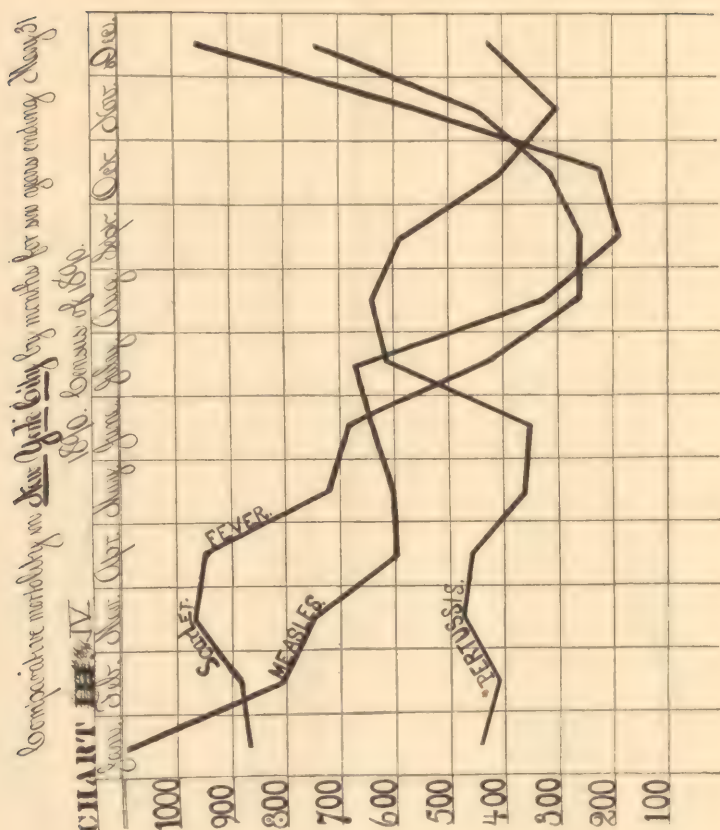


Notifying by months in Large cities of the U.S. Since 1880  
 Census of 1880.

CHART IV. III







Through the courtesy of the Health Officer a very careful study of all the death certificates in the Health Office during the last ten years has been made, and the causes of death in each reported case of whooping cough have been noticed and tabulated. The chief causes of death can be included under the following heads in the order of their frequency :

1. Cerebral Causes—Convulsions, Meningitis, etc.
2. Pulmonary Causes—Congestion, Inflammation, etc.
3. Asphyxia and Syncope.

TABLE IV.

CAUSES OF DEATH.	AGE.			SEX.		COLOR.		MONTHS.													
	AGE.			M.	F.	W.	C.	Totals	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
	1 year and under.	2 to 5 yrs.	over five yrs.																		
I. <i>Cerebral Causes</i> .....	80	35	21	4	50	51	24	85	107	10	7	12	9	11	6	25	23	19	9	8	3
Convulsions.....	10	5	.....	1	4	12	10	6	10	.....	1	1	1	3	4	1	1	1	3	.....	.....
Congestion of the Brain.	1	.....	.....	.....	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Apoplexy.....	13	5	3	1	14	8	14	8	22	2	1	3	.....	2	3	3	1	4	1	1	1
II. <i>Pulmonary Causes</i> .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Congestion of the Lungs.	23	7	3	1	12	22	17	17	34	4	2	1	.....	1	3	7	2	3	4	2	5
Pulmonary Hemorrhage	1	.....	.....	.....	.....	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bronchitis.....	18	11	8	1	16	22	7	31	38	2	3	3	4	2	2	6	1	6	2	1	5
Pneumonia.....	61	33	28	6	59	69	42	86	128	15	10	8	12	8	5	5	11	12	16	7	20
Atelectasis Pulmonum.	.....	1	1	.....	1	1	.....	2	2	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
III. <i>Asthma &amp; Marasmus</i>	52	20	9	3	40	44	30	54	84	2	8	6	4	4	8	10	16	6	3	5	3
IV. <i>Asphyxia and Syncope.</i>	13	4	5	.....	9	12	8	13	21	4	.....	3	.....	3	1	2	2	4	1	.....	1
V. <i>Diarrhea and Dysentry</i>	16	6	1	3	15	11	17	9	26	..	2	.....	.....	1	4	11	4	1	1	.....	1
VI. <i>Tuberculosis</i> .....	1	5	6	4	6	9	2	4	15	1	2	2	.....	2	.....	1	1	2	1	1	2
VII. <i>Pericarditis</i> .....	1	.....	.....	.....	.....	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
VIII. <i>Nephritis</i> .....	1	.....	.....	.....	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
IX. <i>Measles</i> .....	.....	.....	1	.....	.....	1	1	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
X. <i>Malarial Fever</i> .....	.....	.....	.....	1	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
XI. <i>Overdose of Cough Syr.</i>	1	.....	.....	.....	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....

4. Asthenia, Marasmus, etc.
5. Diarrhœa, and Dysentery, etc.
6. Tuberculosis.
7. Pericarditis.
8. Nephritis.
9. Measles.
10. Malarial Fever.
11. Overdose of cough syrup. One case.

A glance at table IV. which contains records of five hundred cases will show that causes connected with the lungs were more common than others being 203, as compared with 146 from cerebral causes, and 84 from exhaustion, marasmus and like conditions. Next in order of frequency comes diarrhœa and dysentery with 26, and asphyxia and syncope with 21 deaths. Tuberculosis, following whooping cough, is given as a cause in 15 cases

Pericarditis; nephritis, measles, malaria, and an overdose of cough syrup claimed one death each

Of the pulmonary conditions, to which death was attributed, broncho-pneumonia was responsible for nearly two-thirds of the cases; bronchitis and congestion of the lungs each for one-sixth; atelectasis is mentioned in two cases only and pulmonary hæmorrhage in one.

Convulsions bear the same relation to cerebral causes that broncho-pneumonia does to the pulmonary ones, causing 107 of the total deaths. Meningitis and cerebritis 22 and congestion of the brain 16; apoplexy is mentioned once only.

As compared with these causes death from slow wasting and exhaustion is not so common; 54 children out of the five hundred cases died of it. Sudden death from asphyxia and syncope is a much rarer cause, occurring in 21 instances only.

An enumeration of the causes of death with reference to age does not confirm the usual statement that cerebral congestion with convulsions is the most common cause of the tremendous mortality in the first year of life. Out of the whole 500 deaths, 207 were under the first year.



Of these 104 were connected with the brain and 103 with the respiratory organs so that there is little or no difference between the efficiency of the two causes in infancy.

Many other interesting facts might be mentioned which are seen by comparing the influences of age, sex and color, but figures may become wearisome and I pass on to speak of what bears more directly upon the purposes I have in view in connection with the treatment of the disease—I mean the influence of season in bringing about the development of cerebral and pulmonary causes of death respectively.

The deaths from pulmonary causes, especially from broncho-pneumonia occur in about equal numbers at all seasons of the year ; while convulsions and other cerebral causes are much more common in summer—*See Chart 5.*

**DEATHS FROM WHOOPING COUGH IN  
WASHINGTON FROM THREE GROUPS OF  
CAUSES, BY MONTHS FOR TEN YEARS  
1885 TO 1895**

**CHART V.**



In the six months of autumn and winter beginning in November and ending with April, there were 121 deaths from cerebral causes ; in the six months of spring and summer and early autumn there were 53 deaths, the fatality being half as great in winter as in summer.

Lesions in the respiratory system are as common however in the one season as in the other, winter having 105 and summer 98 deaths, a difference of only 7. July and August included by far the greatest number of deaths from eclampsia, and December the largest number from broncho-pneumonia, but the deaths from pulmonary lesions are distributed much more equally during the year than are those connected with the nervous system.

The deaths from intestinal causes as might be supposed, happened almost wholly in the summer months. More deaths also occur in summer than in winter from wasting and exhaustion.

In the effort to interpret these facts and to find the reason for the great fatality of whooping cough and in order to determine how it may best be prevented and cured, attention must first turn to the pathological changes, and then to the characteristic symptom—the convulsive cough and to its etiology.

There is no lesion which can be considered characteristic of whooping cough, that is no distinct, causal lesion around which all the symptoms and complicating lesions are grouped. In the beginning there is catarrh of the naso-pharynx, and this may be the only lesion coincident with the development of the characteristic cough.

In advancing cases this naso-pharyngeal catarrh becomes generalized by extension to the lachrymal ducts, the conjunctivæ, the eustachian tube and the middle ear, to the glottis, trachea, large and small bronchi and air vesicles. The more decided pulmonary lesions, emphysema, pulmonary collapse, pulmonary congestion and œdema and broncho-pneumonia are advanced pathological conditions accompanying the later stages or more intense forms of the disease.

The symptoms connected with the nervous system—

blindness, convulsions, hemiplegia, coma, etc., are due to congestion, transuded fluid in the ventricles, œdema of the brain and meningeal hæmorrhage.

The gastro-intestinal lesions are congestive and catarrhal ; the changes in the kidneys are first congestive and then inflammatory.

Without going into questions which are attractive and interesting and in order to learn something of the reasons of this great mortality I would like you to fix your attention upon two points in connection with this disease. 1. The violent paroxysm of cough and their effect upon the heart and circulation. 2. The influence of the resulting heart weakness in the production of the conditions of the brain and lungs which are the most efficient causes of death.

Authors like Osler and Henoch have, from time to time, alluded to the temporary and even permanent injury to the heart in this disease, but the subject has been brought out with greater fullness and force in the papers of Drs. E. Helen Knight and Koplik, recently published, and by the experiments of Muller and Valsalva. These two experimenters have demonstrated ; (1) That in the long drawn inspiration there is dilatation of the right heart, congestion of the lungs, diminution of blood in the left heart, and in the systemic circulation, and (2) that in the expiratory cough the heart is compressed, the venous system is engorged, the blood is forced into the left ventricle and into the aorta, the heart is emptied, its sounds and the pulse beat are weakened. The paper of Dr. Knight, based on the careful daily study of forty cases, dwells upon the disturbance of the heart and circulation and the great and continual strain to which the heart is subjected by the recurring violent pressure of the paroxysms ; this disturbance is shown by the increased rapidity and irregularity of the pulse, its dicrotism and sustained tidal wave, seen in the sphygmographic record, and due to the abnormal distension and relaxation of the coats of the arteries.

Both in this paper and that of Koplik, the more impor-



tant fact is insisted on that the ultimate effect of this mechanical disturbance of the heart is to bring about a permanent dilatation of the ventricles (the increased area being demonstrable by percussion) with great and necessary weakening of their walls, which continues to effect the circulation during the intervals of the paroxysms. This is shown by the weakness of the heart sounds, the feebleness and irregularity of the pulse, the persistent dyspnœa, the œdema of the face and eyelids, and other evidences of venous stasis of organs.

From these disturbances of circulation especially from the venous congestion of organs we have, moreover, the cerebral congestion and œdema, the cause of fatal eclampsia and the albuminuria which Knight found in 56 out of 86 tests ; albumen with blood being seen in 8 cases with occasional hyaline and epithelial casts.

The pulmonary congestion which precedes and causes the bronchial catarrh is of course a part of this same condition ; broncho-pneumonia comes from extension of the process to the small tubes and air cells ; the rarefaction of the air in the alveoli and its effect upon epithelial growth has some part in bringing about the catarrh of the air passages: the traumatism of the mucous membrane from the violent cough is not without effect also.

The equal prevalence of pneumonia in summer as well as in winter in this city gives less importance to cold and exposure as a cause of bronchitis and pneumonia ; undoubtedly they have some influence, but the feeble heart and mechanical congestion of the lung are more potent causes, at any rate, are preliminary and essential stages in the process of bronchial catarrh and broncho-pneumonia. The fact that the deaths in the country from whooping cough are to deaths in the city as 16 is to 9, and that the poor die in larger proportion than those in comfortable homes (430 colored to 230 white are the numbers in the District for ten years) might be used as an argument that exposure to cold is an active agent in the production of catarrh.

The one great danger, a danger which stands out

glaringly in the lurid picture of this disease is the feeble dilated heart and the venous congestion of the organs; and the general disturbance in the arterial and capillary as well as venous circulation.

The vomiting and inability to retain sufficient food is an added source of exhaustion, and to this must be attributed much of the asthenia and marasmus which characterise all bad cases and which are alone the cause of death in many. But here too the heart is made to suffer and an additional cause of heart exhaustion is found in the general inanition.

#### TREATMENT.

What are the data upon which a rational treatment of whooping cough is to be based?

1. That it is a specific disease, due to a micro-organism the action of which is local upon the mucous membrane of the naso-pharynx and upon the the terminal filaments of the nerves.

2. That it is primarily an acute disease, with a tendency to chronicity in its later stages.

3. That the special conditions which call for treatment are the feeble and dilated heart due to mechanical overstrain, and the resulting disturbed state of the circulation in the brain and lungs; cerebral congestion and pulmonary congestion with catarrh being the direct result of circulatory disturbance.

The first step is to recognise it as a specific contagious disease. Being a specific disease with a restricted area of activity and that within reach, the search for specifics has been a rational effort, and we can but welcome every addition to our knowledge made by experiments with antiseptic inhalations, sprays and lotions, designed to destroy microbic activity in the respiratory passages. It would lead me very far from my purpose to go into the history of this part of the subject, but I firmly believe that in the effort to cure the disease by internal and local specific remedies, important if not the most important indications of treatment have been overlooked and lives

sacrificed which might have been saved. Niemeyer many years ago said that "the fact that in whooping cough we have to do with catarrh protects us against that hunt for specifics which is so useless and dangerous." Since this was written the development of antiseptic treatment has been very great, but it is none the less true now than then, that the immediate demands of the attack are forgotten and quite neglected. These immediate demands are the same that confront us in every acute specific disease, which has a limitation in time, and the progress of which can be influenced by prompt and proper care in the beginning; they are the acute nature of attack and the special condition of the heart and circulation.

Trousseau has dwelt upon the febrile feature of whooping cough as being diagnostic, and the study of the temperature in the early stages will show the more frequent incidence of fever than is seen in simple catarrh without the spasmodic element. The study of the temperature gives a test of the gravity of the case and is a means by which those catarrhal changes which are the forerunner of broncho-pneumonia can soonest be detected. In every case of whooping cough from its inception a daily record of temperature should be kept

Whether there is fever or not, the processes which are going on are acute, the characteristic cough soon begins and the heart commences to feel the effect of overstrain. If our specific methods of treatment could now abort the attack, or decidedly modify the character of the cough, the danger from heart strain would be obviated. But so far these methods have not reached a point of perfection and until this is done the principle of treatment should be to give to the heart all of the force we can by relieving it of unnecessary work.

*Rest* therefore becomes the cardinal doctrine of treatment—a doctrine which has not been recognised at all, and which I believe stands at the foundation of all successful management. Oppolzer, many years ago, advised the confinement of the patient to one room, and Niemeyer, writing in 1864, said that he had followed this advice ever



since he knew of it, "with a rigorous exactitude and with the most favorable success" and that he could not sufficiently recommend it.

Niemeyer's suggestion was based upon the dangers of adding to the catarrh by exposure to the external air, but I believe that the idea has a much wider application, and that *keeping the child in one room and at rest in bed, if the paroxysms are at all frequent or severe, is the proper method of treatment in all cases.*

The definite method would be in the catarrhal first stage, if it is known or thought to be the onset of pertussis, to isolate the child absolutely from other children, to keep it as much at rest as possible and if there is any rise of temperature, to put it to bed. When the paroxysmal cough begins the patient if an infant should be treated as if it were already ill, not dressed, but wrapped in a blanket so as to be as equably warmed as if it were in bed; beyond infancy the child should be kept in bed if possible, if not possible in the arms, and cared for as if the worst symptoms were present. During the last winter I had under treatment a case of whooping cough in a child four years of age, who had chronic mitral insufficiency, and no worse condition could have been present; as soon as the "whoop" began the child was put to bed and kept there for three weeks with the result of making her attack much shorter and much less severe than that of her older sister, who was not kept in bed but in the room during the same period.

By such a method of treatment three things are accomplished:

1. Isolation of the patient, and the necessary reduction in the number of cases and deaths.
2. The diminution in the intensity of the specific process; this is not a necessary but a probable result.
3. The rest of the heart and the lessening of overstrain and dilatation.
4. The avoidance of the effects of cold in exaggerating the existing catarrh.

How long should isolation with rest in bed or confine-

ment in one room be continued? So long as the case demands it, so long as the paroxysmal cough by its severity or frequency is distinctly a source of danger; that is for three weeks or four weeks or longer. What matter is it how long, if by such isolation and rest you are reducing the general mortality of the disease and avoiding all risks in the particular case. But it is one of the beneficial effects of seclusion and rest in whooping cough that the stages are shortened so that the duration is reduced to six weeks or less. Neimeyer insisted upon this as a direct result of confinement to the house alone, and during many years of experience with this method, the average of the violent paroxysmal stage has not been more than two weeks, making the whole attack of about six weeks duration.

To what extent this isolation should be enforced under the supervision of the Health Authorities, I am not prepared to say. The practical difficulties in the way are very many, but I see no reason why regulations should not be made which would at least wake the community up to the dangers of the unlimited diffusion of the disease from the absence of any attempt at restriction.

This leads me to speak of the outdoor fresh air treatment of whooping cough—a treatment which I believe is based upon a tradition ingrained into our social organization, part and parcel of inherited, unscientific modes of thought, and entirely irrational. On general principles fresh air is antagonistic to germ life, and foul air favors its activity, but that in seeking fresh air we should put the patient to every risk of fatigue and cold, I believe to be entirely unscientific and lacking in common sense. There is no reason why free ventilation and fresh air should not be made an addition to the treatment by rest and seclusion, but the dangers of the propagation of the disease, the dangers of heart exhaustion and of cold are necessarily incurred in the outdoor treatment as at present practised.

The time comes in whooping cough sooner or later

when the final stage has been reached, the more acute symptoms have subsided, the patient continues to cough spasmodically more or less frequently, there is but little change from week to week ; it is possible that the belief that change of air is specific at this stage may be well founded, but I know of no facts from my own personal knowledge which assure me that it is so.

That the great majority of cases of whooping cough get well, that 2 to 15 per cent. only die is no reason why the rest treatment should not be employed in every instance. I have not attempted to illustrate the advantages of this method by citing cases which have demonstrated its utility, but, as the public conscience has not been raised to the point of regarding whooping cough as dangerous, and as the outdoor treatment has such firm hold upon its faith, the difficulties of enforcing complete isolation and rest have been very great.

In conclusion, the question of prevention must take precedence over every other. An infectious contagious disease can of course only be prevented by isolation. The seriousness of every infectious disease and the ability to control its spread by isolation determine the necessity and propriety of segregating patients. The seriousness, the great fatality of whooping cough has been shown, I think clearly shown; more fatal than measles, hardly less so than scarlet fever, it numbers its victims by thousands and involves incalculable suffering. There is every demand indeed, an imperative obligation upon us to meet this question if it be possible to meet it. We know that isolation alone will prevent its spread, and yet we make no effort to isolate it. Suppose that scarlet fever were half as fatal as it is now would we not be criminally responsible if we did not isolate our patients. And yet with whooping cough, the cause of more deaths than scarlet fever in this community, we permit these children to frequent the public thoroughfares, the theatres, the churches, and we only smile when a large audience is disturbed by the shrill whoop of the little sufferer. Imagine a child with diphtheria, measles,



or scarlet fever carried about in public places; it would be a folly and a crime to permit it, and is it less a folly and a crime with thirty to one hundred deaths a year from whooping cough in this city.

An average of many authors fixes the death rate at 7.6 per cent. This means that about one thousand children are diffusing the poison of whooping cough in the streets and public squares of Washington during every year, and not only are they allowed to do it, but they are ordered by their physicians to do it, in pursuance of the out-of-door treatment.

In New York City over 6,000 children are allowed annually to disseminate the germs of the disease. In one month alone—August—in Washington there were 126 cases with nine deaths. Imagine these 126 children being permitted to sow the seeds during August which were to be reaped in the deaths of eight children in September, six in October, three in November, and four in December, a total of twenty-one children whose lives might have been saved if isolation had been practiced.

Or to make the figures more striking, imagine 1,404 cases in the month of August in the city of New York infecting the hundreds of children who were to be ill in September, October, November and December, 148 of whom were to die miserable deaths, deaths preceded by weeks of agonized suffering.

If we were to relax discipline in the 500 to 1,000 cases of scarlet fever, or of measles which we have here every year we should justly consider ourselves culpable, and yet we deliberately expose the children of the city to decimation—nay we advise and encourage the dissemination of the disease.

I know what the difficulties attendant upon the quarantining of a case of whooping cough are during the eight to twelve weeks of its weary travail, but if life is to be saved; if life is not deliberately to be put in jeopardy, we must attack this question and secure some improvement upon our present methods. It has been shown how rest and isolation may be made to harmonize and how

in securing the best results in the individual cure, we are at the same time preventing the spread of the disease.

Particular care should be taken to secure the removal from the sphere of infectious influence of all children who are tubercular, rachitic, syphilitic or who have bronchial catarrh, all sick or debilitated children. But the quarantine should be as strict as that for measles or scarlet fever. Why should it be less so? If we will enquire into the reason for the difference which is made we will see that there is no scientific reason, but merely the rule of tradition and custom which influences us and no more, and we submit our science and our common sense to this.

The practical points of this paper—the only points which I have dwelt upon and the only points which I would like to drive home with as stunning a blow as I can give are that whooping cough is a dreadfully fatal disease—and a terrible cause of suffering even where it does not kill, that we, as physicians—health guardians of the families of our patients, are directly responsible, almost wholly responsible for these deaths, and that every obligation of science and knowledge, every call of duty summons us at once and forever to inaugurate a new era in its prevention and cure.







# ARCHIVES OF PEDIATRICS

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